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STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
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May 24, 1985

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Mr. Robert E. Dolphin, Director
Yakima Agricultural Research Laboratory
3706 W. Nob Hill Boulevard
Yakima, WA 98902

Re: Facility No. WAD120513957 Closure Plan Review

Dear Mr. Dolphin:

This letter details our formal review of the Yakima Agricultural Research Laboratory (YARL) closure plan which you submitted on January 25, 1985. The plan was submitted prior to the February 1, 1985, deadline. Thank you.

While your plan gives a representation of your proposed closure activities, additional information and detail are required by WAC 173-303 (Washington State Dangerous Waste Regulations) and by 40 CFR 265 (EPA Interim Status Standards).

I have listed the additional requirements in the enclosed "Plan Amendment" section. I have also enclosed a copy of the Department's current cleanup policy guidelines which detail the requirements for site cleanup levels.

It is hereby requested that the YARL closure plan be resubmitted to my office by July 12, 1985, incorporating the additional required inputs detailed in the enclosed "Plan Amendment" section.

Please feel free to call me at 575-2490 if you have any questions regarding this request or if you would like to schedule a meeting to discuss these matters.

Sincerely,

Dom Reale

Dom Reale
Environmental Quality Division

DR:mjj

Enc: Plan Amendment
HCIC Policy

cc: Dale Nason, Yakima Agricultural Research Lab

PLAN AMENDMENT

In order that your closure plan be made approvable by the Department, the following additional input is required:

1. Site detail to be provided:

   a. A small scale map of the facility, showing the map scale, surface waters (including irrigation canals and intermittent streams), surrounding land uses (residential, commercial, agricultural, recreational), map orientation, legal boundary of the facility, injection and withdrawal wells on and off site (commercial, industrial and domestic), storm, sanitary and process sewers.

   b. A large scale map or drawing showing three-dimensional detail of the septic tank and drainfield, monitoring well and soil core sample locations.

2. Facility History

   Provide a chronological profile of the installation of the drain-field/tank and subsequent use patterns, materials discharged, etc.

3. The groundwater monitoring system must consist of the following:

   a. At least one (1) hydraulically up-gradient monitoring well per 40 CFR 265.91(a)(1).

   b. At least <u>three</u> (3) hydraulically down-gradient monitoring wells per 40 CFR 265.91(a)(2) and (b)(1). The point of compliance, referenced in WAC 173-303-645(6) must be among the down-gradient points.

   c. The wells must be constructed in accordance with 40 CFR 265.91(c). All wells must be constructed so as to sample the uppermost aquifer.

   d. Proponent must develop and follow a groundwater monitoring plan per 40 CFR 265.92(a). This plan is to be submitted with the revised closure plan. The plan should include well locations, depths, screened intervals, sampling and drilling methods, and well construction. Sample collection, handling, * QA/QC and cleaning between samples is to be detailed.

* Quality Assurance/Quality Control

4. Sample Analysis

a. 40 CFR 265.92(b)(1) parameters (EPA Interim Drinking Water Standards):

Arsenic
Barium
Cadmium
Chromium
Fluoride
Lead
Mercury
Nitrate (as N)
Selenium
Silver
Endrin
Lindane
Methoxychlor
Toxaphone
2,4-D
2,4,5-TP Silvex
Radium
Gross Alpha
Gross Beta
Turbidity
Coliform Bacteria

b. 40 CFR 265.92(b)(2) parameters:

Chloride
Iron
Manganese
Phenols
Sodium
Sulfate

c. 40 CFR 265.92(b)(3) parameters:

pH
Specific Conductance
Total Organic Carbon (TOC)
Total Organic Halogen (TOX)

d. DDT
DDE
DD~~E~~D
Lindane
Azinphosmethyl
Parathion
Paraoxon
Organophosphates
Chlorinated Hydrocarbon Scan
Diazinon
Chlorpyrifos
Endosulfan I and II
Toluene
Xylene
Benzene
Pyrene

Sampling Timeframe:

a. Proponent shall sample initially for all of the above parameters.

b. Proponent shall sample quarterly for one (1) year the c., and d., parameters listed above.

5. Groundwater Flow Characterization

a. Proponent shall determine the depth to groundwater and direction of groundwater flow, showing any seasonal fluctuations, including effects of irrigation.

b. Each time wells are sampled, groundwater elevations should be determined per 40 CFR 265.92(e).

6. Soil Core Sampling

a. Background values must be established for all Section 4.d., parameters.

b. As mentioned in Part 1.a., and b., soil core sample locations should be shown on a map or diagram which shows their position with respect to the drainfield in three dimensions showing the site's soil and rock strata and the water table.

c. Hydraulically down-gradient soil core sample results will be compared with the established background soil sample results to determine if there is a statistically significant increase in parameter values above background.

Cleanup policy is explained in detail in the enclosed "Final Cleanup Policy - Technical".

7. Splitting Samples

a. Proponent will inform the department prior to extracting soil and groundwater samples which will be used for final cleanup determination so that the department may draw splits or identical samples.

8. Closure plan shall include a chronologic schedule of proposed closure activities.

9. Post Closure

The post closure requirements of WAC 173-303-610(7) through (10) will be waived if your groundwater and soil core monitoring show no significant increase in the specified constituent values of Part 4., above background values. Post closure may be required if any of those constituent values exceed background by a statistically significant margin. You are required to prepare a basic post closure contingency plan which addresses WAC 173-303-610(7) through (10) to be used in the event that said background constituent values cannot be achieved.

10. Financial Requirements

Since YARL is a government facility, the financial requirements of WAC 173-303-620 are waived per -620(1)(c).

Plan Amendment and Revision of the Closure Plan
for Pesticide Disposal Drainfield at the USDA's
Yakima Agricultural Research Laboratory
September 30, 1985

In lieu of seeking a permit to operate the septic tank drainfield as a pesticide disposal system, the leadership of the Yakima Agricultural Research Laboratory (USDA-ARS) has opted to close the system. This document outlines the closure plan and includes maps and drawings that are pertinent.

INTRODUCTION

1. The Yakima Agricultural Research Laboratory (YARL) is charged with developing insect control technologies that will be useful to the fruit and vegetable industry of the Pacific Northwest. In the earlier years of the Laboratory, from late 1920, until a few years ago, chemical control studies using insecticides were a major feature of the Laboratory's program. In recent years, the emphasis has changed and the use of insecticides as a research tool is now a minor component of the research program. Various systems using natural controls and biological control agents are emphasized and these are compatible with human health and safety and have no adverse environmental effects.

Pesticide residue analyses by research chemists at YARL have demonstrated that the residue of insecticides introduced into the septic tank drainfield in the form of excess dilute sprays tank mix and rinse water (rinsate) was of a low order. Residues of organophospate and carbamate insecticides were not recovered but some trace amounts of organochlorine insecticides (DDT, lindane) were present as one would expect in soil that once was in orchard culture. Research plots adjacent to the septic tank drainfield have a normal production of vegetable plants and associated insects which suggests that the disposed pesticides have dissipated. If past introduction of dilute insecticides into the drainfield decontamination system has had a deleterious effect on the immediate environment it is certainly not obvious. We have no evidence to suspect that there is groundwater contamination.

While some dilute spray tank residues and rinsates have been disposed of by the septic tank treatment method, concentrates of the pesticides have never been introduced into that system. These concentrated materials, in

Response to Comment a.

the form received from the manufacturer, included emulsifiable concentrates, pure technical, wettable powders and granules. Unwanted concentrate material were not disposed of on YARL gounds. These materials were handled in the following manner: in 1981, 1982 and 1984 shipments of 1725, 884 and 1849 pounds respectively were shipped by a licensed chemical waste hauler to the Chem-Security Systems facility at Arlington, Oregon in accordance with state and federal laws and regulations. These materials were in storage as part of active experimental pesticide inventories until immediately prior to the formation of a shipment. At that time, the pesticide stocks were inspected and unwanted, overage or contaminated materials were identified as such and prepared for shipment.

In the future we do not expect to repeat this process due to the reduction in the size of the insecticide research program and closer monitoring of pesticide useage. Present instructions are such that surpluses from insecticide concentrates and prepared sprays will be held to a minimum. Excess material left over after experimental plots are treated will be sprayed onto extra plots according to label instructions, registration allowances and ARS Directive 600.12 (attached). Our future requirements will be limited to empty container disposal.

The objective of the research plan is to demonstrate that hazardous chemical wastes are not present in amounts that constitute a threat to the soil and water environment in and near the closed pesticide disposal area. The YARL does not synthesize or manufacture pesticides. During the course of a year, a maximum of 55 gallons of unwanted, overage, contaminated or otherwise unusable pure or formulated insecticides, may be identified as such and removed from active pesticide stocks for disposal. These will be shipped to the Chem-Security Systems facility at Arlington, Oregon for disposal using a licensed chemical waste hauler in accordance with federal and state laws and regulations. There is no intention to dispose of these materials on YARL leased property. The materials to be disposed would be identified as waste material by an annual inspection several weeks prior to shipment.

FACILITY HISTORY

2. The pesticide disposal system prior to its closure was a modification to an existing septic tank and drainfield system. The system was developed in order to protect the environment and Laboratory workers

from hazardous wastes generated as excess sprays from research plots. This system was installed in 1961, probably by laboratory personnel, using the standard plumbing methodology of the time. A restroom was constructed at the same time in a nearby shop and storage building. The washbasin and commode of the restroom were linked to the septic tank by drain pipes. The tank has a 300-gallon capacity and its overflow effluent is discharged through a 30 foot drain tile set below the ground at a depth of about two feet. The tile is surrounded by a bed of stream gravel. Pesticides in dilute form were first introduced into the system in about 1965 when a pesticide storage building was constructed. A sink installed in this building was connected by drain plumbing to the septic tank. Rinse water containing pesticides washed from hand sprayers, glassware, and containers would flow to the septic tank from this sink. In about 1974, an outdoor surface drain surrounded by a concrete pad was constructed and the drain plumbing discharged into the septic tank. Field sprayers would be drained of excess spray mixtures, and the sprayers and tractors would be cleaned by a water hose at this drain site. The intent of this pesticide system was to protect the surface environment by introducing pesticide waste into a subterranean site in which chemical and biological degradation may occur. Other equipment and vehicles were also hosed off at the outside drain port. Runoff from rain and snow could also enter the drain when it was open from 1974 to 1985. When a decision was made by ARS management personnel to close the facility, the sink was disconnected in June 1984. Waste water delivered through the sink drain and rinsate from the spray equipment was collected in portable containers during the 1984 growing season and disposed of in the field according to ARS Directive 600.12 (enclosed). The workers were instructed not to introduce any more insecticides into the system. When it became known that equipment being washed at the drain was contaminated with pesticides, the ground drain was sealed with concrete on about June 1, 1985. The restroom connection to the septic tank is still functional and is in use.

There are no records on file relative to the construction of the septic waste system mentioned above. No staff member presently on board was here in 1961 when the septic tank was installed but some employees have used the disposal system. There is no log as to which chemicals were disposed of, nor in what amounts or dilution. At the time the system was in place, there was no requirement for such records to be kept and none were. Each time sprays were applied to research field plots, the equipment was washed at the ground drain. Insofar, as the pesticide research of the Laboratory has involved use of registered insecticides and some fungicides and weedicides, used by fruit and vegetable growers in the region plus experimental insecticides provided by chemical companies, the number of different materials disposed of during the 20 years the system operated is likely to be several hundred compounds or more. These would fall in the broad categories of chlorinated hydrocarbons, organophosphates, carbamates, etc. Diluted pesticides known to have been introduced into the system with wastewater include Guthion, Sevin, malathion, parathion, TEPP, Temik, methoxychlor, Kelthane, lindane, Captan, Cyprex and Benylate. No heavy metals including lead arsenate were ever discharged into the spray disposal system.

GROUNDWATER MONITORING SYSTEM

3. MONITORING WELL LOCATIONS - To monitor actual and potential ground water contamination, YARL will have a commercial well-driller install four test wells on the grounds. Three of these will be down-gradient, toward Wide Hollow Creek (a stream located one-half mile south of the Laboratory), in the direction of groundwater flow (Reference: Department of Ecology (DOE) letter, 5/24/85, attached) (Figure 1). The placement of the point of compliance, Well A will be along a southeast transect from the system drainfield at a distance of 30 feet or less from the outside sealed drain. Well B and Well C will also be 30 feet or less from the drain along east and south transects respectively.

Response to Comment C.

A fourth test well (Well D) will be placed to the north northwest on the up-gradient side, opposite of the direction of the presumed groundflow, according to the specification of 40 CFP 265.91 and WAC.173-303-645. This site is in a lawn area, west of the main building, as shown in Figure 2. The wells are to be installed by a commmercial well-driller and will be used solely for water quality tests and the measurement of the depth from the surface of the ground to the top of the first aquifer.

All actual well sites will be determined jointly by ARS and DOE personnel on the ground before the beginning of actual well-drilling.

MONITORING WELL INSTALLATION

Each monitoring well will be drilled using air-rotary drilling equipment equipped with a drill-through casing hammer. Six-inch diameter steel casing will be drilled to the total depth and then withdrawn during placement of the permanent piezometer(s). The permanent piezometers (monitoring wells) will be 2-inch diameter flush-threaded PVC pipe with 10 feet of slotted screen placed in the upper horizon of the uppermost aquifer. The annular space between the 6-inch diameter hole and the slotted screen piezometer pipe will be packed with selected filter sand as the 6-inch casing is extracted. The annular space above the sampling depth will be sealed with a suitable grout/bentonite slurry.

Based on existing information, the uppermost aquifer occurs at a depth of about 20 to 25 feet. Accordingly, it is anticipated that the maximum depth of the uppermost piezometers will be 30 feet or less. If ground water is encountered at shallow depths (10 feet or less) in quantities sufficient to be sampled, multiple (nested) piezometers will be set in the point of compliance borehole. If the depth of the uppermost water bearing zone is greater than 50 feet below the water table a mid-depth piezometer will be added to the point of compliance well. The depth of this zone will be determined by the well driller. Figure 3 illustrates the single and multiple piezometer completion options and construction details to be used. As shown, a grout/bentonite seal will be placed between sampling horizons in the nested completion.

Response to the 1st part of Comment C.

Each monitoring well installation will be completed by pump and surge development to provide sediment free water samples. A locking monument case will be cemented into place over each piezometer. The elevation of the measuring point of each monitoring well and other onsite monitoring points will be determined by instrument survey to within 0.01 feet. The location of each monitoring point will also be determined by instrument survey.

Other procedures for quality assurance to be used during monitor well installations are discussed below under Quality Assurance.

All initial water samples will be taken from the uppermost aquifer because pesticides introducted into the system were diluted, soluble, emulsifiable and subject to oxidation, hydrolysis and/or adhesion to solid particles. Since no heavy elements were introduced, if the pesticides are not found in the uppermost aquifer it is highly unlikely that they will be found in lower aquifers. If pesticide levels that exceed background are found in any of the three wells near the drainfield, ARS will deepen the wells to sample the next lower aquifer or add another well near the point of compliance for this purpose. The sampling regimen would concentrate on the chemicals found to be above background in the uppermost water bearing zone. ARS will defer to DOE's instruction on deepwell drilling if this rationale and plan are not acceptable to the latter agency.

MONITORING AND SAMPLING - DOE, Yakima, will be advised one week prior to the taking of samples in order that they may be present if they wish to observe and to take split samples. Water levels in each piezometer will be measured immediately prior to collection of the quarterly samples. Water level measurements will be attempted to the nearest 0.01 feet but field conditions may dictate lesser accuracy in some cases.

Samples will be collected using a dedicated submersible sampling pump. In conjunction with, but immediately prior to collection of samples, a volume of water equal to 5 times the volume of water contained in the piezometer will be removed. Other quality assurance procedures for sampling, sample preservation, storage, shipment, chain of custody control and analytical details are discussed under the Quality Assurance Section of this document.

LABORATORY ANALYSIS

Ground water samples collected as described in this document will be analyzed by a qualified commercial laboratory for the parameters listed in Table 1. These parameters are based on the enclosed DOE letters of 5/24/85, 8/13/85 and subsequent discussions. Note that the first set of quarterly samples will be analyzed for all parameters while the second, third and fourth quarterly set will be analyzed for parameter listed under (c) and (d).

In addition, four replicate measurements will be made on the first quarterly ground water samples, but not on other samples.

In addition to quarterly ground water samples distilled or deionized water used for sampling pump cleaning during collection of the first quarterly ground water samples will be analyzed for all TABLE 1 constituents.

QUALITY ASSURANCE

In addition to the procedures described elsewhere in this document, some of which are related to quality assurance, the following procedures will be utilized to assure the quality of results from this ground water monitoring program.

MONITOR WELL INSTALLATION - General monitoring well installation procedures are discussed in Section 3 and illustrated in Figures 2 and 3 of this document. In addition, the following quality assurance procedures will be implemented.

A qualified geologist or geotechnical engineer will supervise the installation of all monitoring wells. This geologist or engineer will be familiar with the design and other provisions of this plan such that the proposed wells are installed and completed as provided in this document. During well installation, appropriate geologic and hydrologic information shall be recorded for use in characterization of geohydrologic conditions at the site as provided under the REPORTS section of this report.

Prior to drilling each monitoring well, drilling tools to be placed into the boring (drill bit, sub, drill pipe and casing) will be thoroughly steam cleaned to avoid contamination and cross-contamination of the monitoring wells. A sample of the water feed to the steam cleaner will also be collected and analyzed for the constituents listed in Table 1 of this document. As provided under the MONITORING WELL INSTALLATION Section of this document, 2-inch flush-threaded PVC pipe will be used for the well piezometers. Prior to placement in each well, the piezometer PVC well screen and pipe will be thoroughly steam cleaned to avoid inadvertent contamination of the wells.

For the same reason, no glue will be used on the PVC pipe.

After completion of piezometers in the wells, a locking monument case will be installed at ground surface as shown in Figure 3. This case will consist of a steel pipe extending approximately 2 feet above and below the gound surface with a locking, vented cover or cap. Concrete will be set within the case, extending to 2 feet depth in the annular space of the borehole. Concrete will also be set to the full case depth around the exterior of the case. The top surface of this exterior concrete will be slightly above ground surface and will slope away from the case to prevent surface water collecting around the well. Vehicular guards e.g. (steel posts) will be used to protect the wells.

MONITORING AND SAMPLING - General procedures for monitoring and sampling wells are discussed above. In addition to those procedures and in view of the parameters included for laboratory analysis in this plan, certain additional quality assurance procedures for this program are provided below.

Following measurement of water levels in each monitoring well, a volume of water equal to 5 times the volume present in the piezometer will be pumped from the well using the dedicated sampling pump. This will assure representative samples from the aquifier. The dedicated submersible sampling pump and discharge line must be thoroughly cleaned prior to the 5 well volumes removal/sampling at each well. This cleaning procedure will consist of flushing the pump and discharge line with a detergent solution followed by a rinse with distilled or deionized water. A sample of the distilled or deionized water will be collected during the first quarterly sampling and analyzed for all Table 1 parameters.

Immediately following removal of the 5 well volumes, samples will be collected for field measurement of pH and specific conductance. These field measurements will be made and data recorded prior to or after collection of other samples at each well. During the first quarterly sampling, four samples at each well will be collected and quadruplicate measurements of pH and specific conductance will be made. During subsequent sampling, one sample will be collected at each well for pH and specific conductance measurement. Instruments utilized for field measurement of pH and conductivity will be properly warmed up, calibrated, temperature corrected or otherwise adjusted in accordance with the manufacturer's operating instruction manual prior to making these measurements at each well.

Samples for laboratory analysis will then be collected and handled as provided below. Sample containers and preservatives to be used will be as indicated in Table 1. For the first quarterly sampling, individual samples would be required to cover all laboratory analysis parameters at each monitoring well in accordance with Table 1. However, since these parameters will be tested in quadruplicate for the first quarterly sampling, quadruplicates of each sample type will be collected, i.e., x 4 total samples, at each monitoring well. During second, third and fourth quarterly sampling, only individual samples for laboratory analysis will be required at each monitoring well as listed under (c) and (d) of Table 1. All sample containers will be obtained from the laboratory which will perform the analyses. Preprinted labels will be attached and preservatives, if any, added by the laboratory. All sample containers will be marked with analytical parameters and preservatives added prior to leaving the laboratory. As soon as sampling is completed at each well, a unique sample number, sampler's name, date, time, and place of collection will be entered on sample container labels. Sample data will then be immediately entered into a data log book and on a chain of custody record (example exclosed) and sample containers placed in a portable cooler with ice prior to proceeding to sample the next well. All samples will remain in a portable cooler with sufficient ice until delivery to the analytical laboratory.

Following completion of sampling at all wells according to the procedures described above, samples will be transported by sampling personnel to the contracted analytical laboratory. Each time the samples change possession, the person relinquishing possession and the recipient shall sign and enter the date and time in the spaces provided on the chain of custody record, including when received by the analytical laboratory. The chain of custody record shall remain with the samples at all times through laboratory processing. If the samples have to be shipped to another city, a modified handling system will be developed.

Laboratory Analysis - Methods to be used in the laboratory for preparation and analysis of samples are listed in Table 1 if known. Note that two alternate methods can be used in some cases and that there is no sample preparation required for some parameters. Quadruplicate analyses will be performed on the first quarterly ground water samples as discussed above.

Only laboratories which have a written quality assurance plan and can document use of EPA acceptable methods will be utilized for laboratory analysis.

REPORTS

Following monitor well installation and analysis of the first quaterly samples, a preliminary report will be prepared and submitted to DOE. Data and information presented in this report will be from work performed during this monitoring plan, during closure and the previous soil and ground water evaluation. This report will address:

1. Characterization of geologic and hydrologic conditions at the site including evaluation of geologic data from monitor well boring logs, measured ground water and surface water levels, ground water gradients and flow direction, seasonal fluctuations, effects of irrigation; and
2. Characterization of ground water quality and statistically significant differences in ground water quality for downgradient versus upgradient monitoring wells.

This preliminary report will be updated (or an addendum prepared) and submitted to DOE if second, third and fourth quarterly monitoring results indicate significant changes in hydrologic conditions. If a statistically significant increase (or pH decrease) of monitored ground water quality parameters is found for downgradient versus upgradient monitoring wells, DOE will be notified within seven days of this finding. The data will be statistically analyzed according to procedures of EPA-5W-963 (rev), Ground-water monitoring guidance for owners and operators of interim status facilities. During additional monitoring and sampling after this point, DOE has requested to be allowed to split samples. If a statistically significant increase is shown by further analysis, then additional monitoring, establishment of an alternate concentration limit, or corrective action may be appropriate.

The direction of flow of the groundwater will be determined by analysis of depth soundings of the four wells with adjustments made for surface elevation of each well-head.

TABLE 1

(a) 40 CFR 265.92(b) (1) parameters (EPA Interim Drinking Water Standards):

	Sample Size,ml	Preservative added	Comments
Arsenic	1000		
Barium	"		
Cadmium	"		
Chromium	"		
Fluoride	"		
Lead	"		
Mercury	"		
Nitrate (as N)	"		
Selenium	"		
Silver	"		
Endrin	"		
Lindane	"		
Methoxychlor	"		
Toxaphene	"		
2,4-D	"		
2,4,5-TP Silvex	"		
Radium	"		
Gross Alpha	"		
Gross Beta	"		
Turbidity	"		
Coliform Bacteria	"		

(b) 40 CFT 265.92(b) (2) parameters:

Chloride	"		
Iron	"		
Manganese	"		
Phenols	H3PO4, $CuSO_4$		
Sodium	"		

(c) 40 CFR 265.92(b) (3) parameters:

pH	25		Determine in field
Specific Conductance	100		Determine in field
Total Organic Carbon (TOC)	250	H3PO4	
Total Organic Halogen (TOX)	250		no headspace

TABLE 1 (Continued)

		Sample Size, ml	Preservative added	Comments
(d)	DDT	1000		
	DDE	"		
	DDD	"		
	Lindane	"		
	Azinphosmethyl (Guthion)	"		
	Parathion	"		
	Paraoxon	"		
	Organophosphates	"		
	Chlorinated Hydrocarbon Scan	"		
	Diazinon	"		
	Chlorpyrifos	"		
	Endosulfan I and II (Sevin)	"		
	Kelthane	"		
	Malathion	"		
	TEPP	"		
	Temik	"		
	Captan	"		
	Cyprex	"		
	Benylate	"		
	Toluene	"		
	Xylene	"		
	Benzene	"		
	Pyrene	"		

Footnote: (1) All samples to be stored on ice or refrigerated at 4 degrees centigrade. No samples to be field filtered.

SOIL CORE SAMPLING

4. The Yakima Laboratory is located on level ground over a syncline between 2 anticlines which form prominent ridge-type hills known as Ahtanum Ridge and Yakima Ridge. Bedrock is basalt deposited from the Columbia Basin volcanic eruptions and lava flows. These in turn were later folded to form the characteristic ridge-valley (anticline-syncline) topography of the area. Above bedrock is the Ellensburg Formation which is a composite of alluvial sediments of gravel, sand, silt and clay. Stream alluvium overlays this formation and is the uppermost source of groundwater. Overlaying this alluvium produced by the Yakima River and tributaries are subsoil and soil derived from wind-blown loess, ridge erosion and volcanic ash. (Reference: Geology of the Yakima Area, N. P. Campbell, Yakima Valley College, published by author)

The 1937-42 soil survey of the Soil Conservation Service characterize the YARL site as follows: Ritzville silt loam, 1-8% slope, uplands. The surface soil is pale-brown silt loam, neutral to mildly alkaline, noncalcareous. The subsoil is pale-brown to light yellowish-brown silt loam or loam, mildly alkaline, calcareous in the lower part. The substratum is loessial material. The soil is not salty or alkaline, has slight erosion hazard, is easy to work, has moderate inherent fertility, medium internal drainage, a moderate to high capacity to hold water, a depth of 3½+ feet and had an original cover of sagebrush and grass. The soil is suited for supporting irrigated orchards, alfalfa production and pasture.

Soil cores will be taken at 6", 2' and 4' depths in a grid pattern that is parallel to the long axis of the drainfield tiles and extends 3' beyond the drainfield terminus. Cores will be taken at 1' and 2' on both sides of the single drainfield (Figure 4).

An up-gradient soil sampling station will also be established at the well used for background evaluations. These stations are illustrated on the attached drawing (Figure 2). Shallow cores will be taken manually using a soil corer. Deeper cores including those depths that cannot be reached manually will require power driven equipment. A tractor mounted soil anger or Gitting's soil samples will be used if the target soil depth cannot be reached easily by hand tools. The soil to be sampled will be taken from the depths shown above in sufficient amounts to permit testing of the chemicals in Table 1. The commercial laboratory contracted to analyze the soil samples must specify how much soil is needed to do the comprehensive sampling. These samples will be placed into plastic bags or other containers, treated with fixatives as required, labelled as to station, depth, and chemical to be analyzed, and held on ice and in cold storage prior to delivery to the analytical laboratory. The features of this methodology will be similiar to the handling of the water samples. The soil samples will be taken close to the time that the groundwater samples are collected. A research data log book and 2 chain of custody record will be maintained. The DOE will be given one week notice prior to the beginning of the soil sampling process. DOE can be provided split samples upon request.

The pesticides mentioned above in Table 1 will be tested for and measured by the same laboratory or laboratories that process the water samples duplicating the provisions of pages 6 & 7 above. Soil samples will also be taken from the orchard (up-gradient) and vegetable (down-gradient) plot areas on the laboratory grounds. Subsequent sampling periods will likewise parallel those used for the water samples (one replicate per well, (c) and (d) of Table 1) including providing DOE with notice and split samples. Additional samples, both in time, depth and location can be added if so indicated by the results of the above tests. Soil cleanup level will be to background unless alternate limits per WDOE Final Cleanup Policy are warranted. The sampling program will cease once DOE determines that the site is non-hazardous and recommends to EPA that the site be removed from the National Oil and Hazardous Substances Contingency Plan (NCP).

Response to Comment i.

The results of the up-gradient and down-gradient soil sample will be analyzed statistically according to SW-963 (rev.) to determine if there are pesticide levels in the latter (disposal area) that exceed the former (background as old orchard site, pre USDA occupancy).

TIMETABLE OF EVENTS

5. T : Time DOE and Administrator of USDA/ARS accepts closure plan and the latter makes funds available for implementation if beyond YARL financial capability.

T + 3 months: Well contract awarded. Commercial laboratory alerted.

T + 6 months: Wells installed.

T + 6 months: Initial sample set of water and soil taken. May need to delay until weather and ground conditions are favorable.

T + 9 months: 2nd sample set taken.

T + 12 months: 3rd sample set taken.

T + 15 months: 4th sample set taken.

T + 16 months: 1st year results analyzed.

T + 17 months: DOE/USDA representatives meet and review 1st year results.

T + 18 months: 5th sample set taken if DOE advises USDA that a 2nd year of sampling is needed before they can certify that YARL site is not an environmental hazard. Sequence repeats until latter goal is achieved or USDA takes other course of action.

FUTURE RESEARCH

6. Once the YARL pesticide disposal site is officially closed with DOE and EPA sanction, the septic tank disposal system of pesticide waste facilities may be made available to DOE for research purposes. In such circumstances, DOE personnel would be the lead investigators and ARS personnel would be cooperators under provisions of a Memorandum of Understanding between the two agencies.

POST CLOSURE

7. Per DOE's letter of May 24, 1985, the post closure requirements of the Dangerous Waste Regulations are waived if there is no significant chemical pollution in the soil or groundwater in the drainfield or downstream compared to background. If such objectionable chemical pollution is demonstrated, post closure contingencies would be negotiated between USDA-ARS and DOE until a satisfactory course of action is agreed upon. These could include: (1) Monitoring of the pollutant chemical indefinitely until such time as DOE agrees that the chemical residue is no longer a

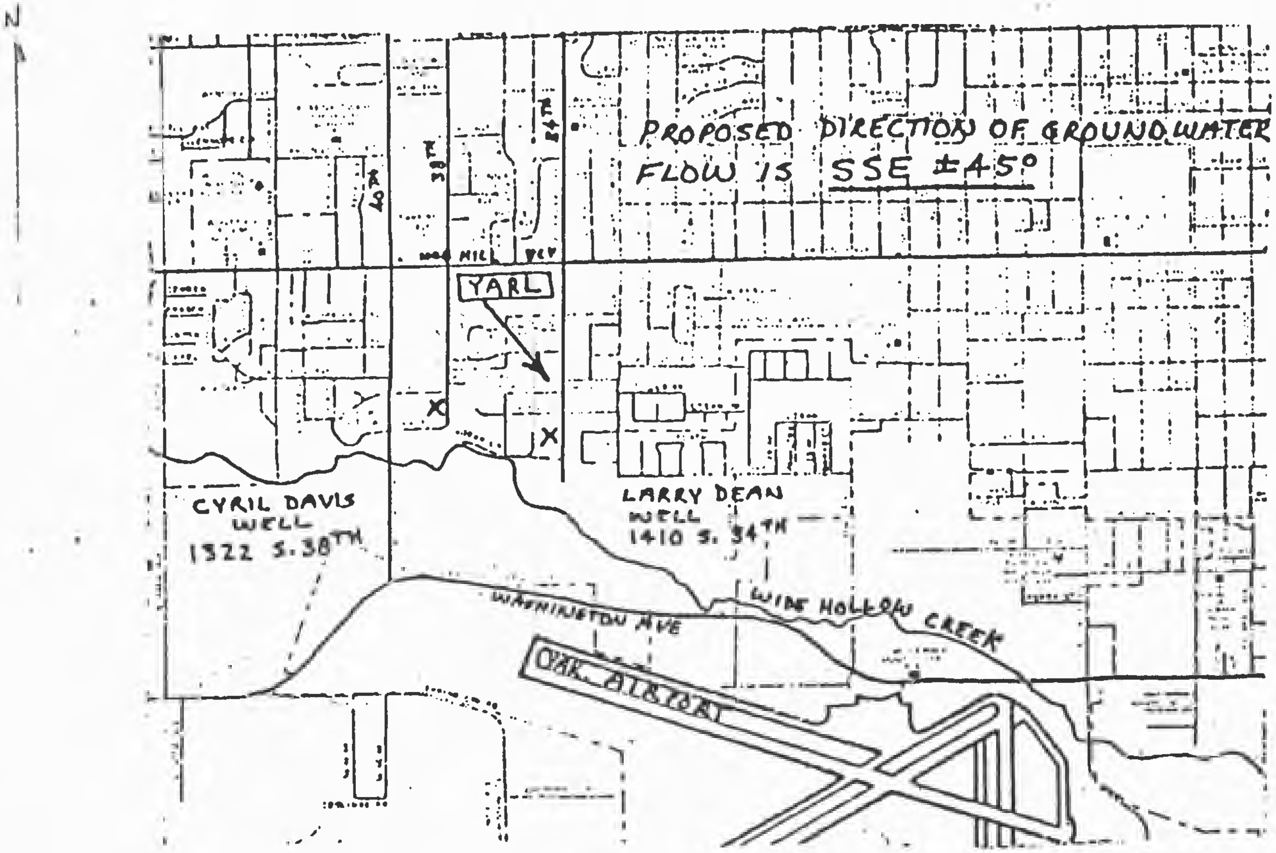
threat to the environment. (2) Remove and dispose of the septic tank, its drainfield and contaminated soils. The boundaries of the offending chemical site would be determined by core sampling of soil in a grid system from the surface to the groundtable. The soil that is a threat to the environment would be removed by earth-moving equipment, placed in barrels and removed to Arlington, Oregon for treatment disposal. Holes left by the excavation would be filled by uncontaminated topsoil and subsoil in order to return the site to near normal conditions. (3) Decontaminate toxic wastes in place if feasible. Oxidants, acids, bases, or other chemicals that would be detoxifiers would be introduced into the septic tank system if there was mutual agreement that this constitutes an effective and non-deleterious way in which to eliminate chemical wastes which are present in undesirable amounts. (4) Hook up the toilet that is connected to the septic tank to the Yakima sanitary sewage system in order to minimize a leaching source of water if migration of persistent chemical residues into the groundtable is likely to occur. (5) Representatives of ARS and DOE would meet together yearly, review data collected and discuss the course of action for the coming year and beyond. This should be done several months before the beginning of each fiscal year to permit budgeting of anticipated costs for the upcoming year.

The development of this Closure Plan is in keeping with USDA's willingness to cooperate with other State and Federal agencies. The Yakima Agricultural Research Laboratory has limited authority and financial resources to actively implement the plan as outlined here or in subsequent modifications. To proceed with active implementation procedures will require the approval of the Administrator of the Agricultural Research Service plus Headquarter's consideration of special funding from reserves. ARS retains the right of publication for data collected during the studies described above. Joint authorship of papers by scientists in ARS and DOE could be the subject of negotiation.

CERTIFICATION OF CLOSURE

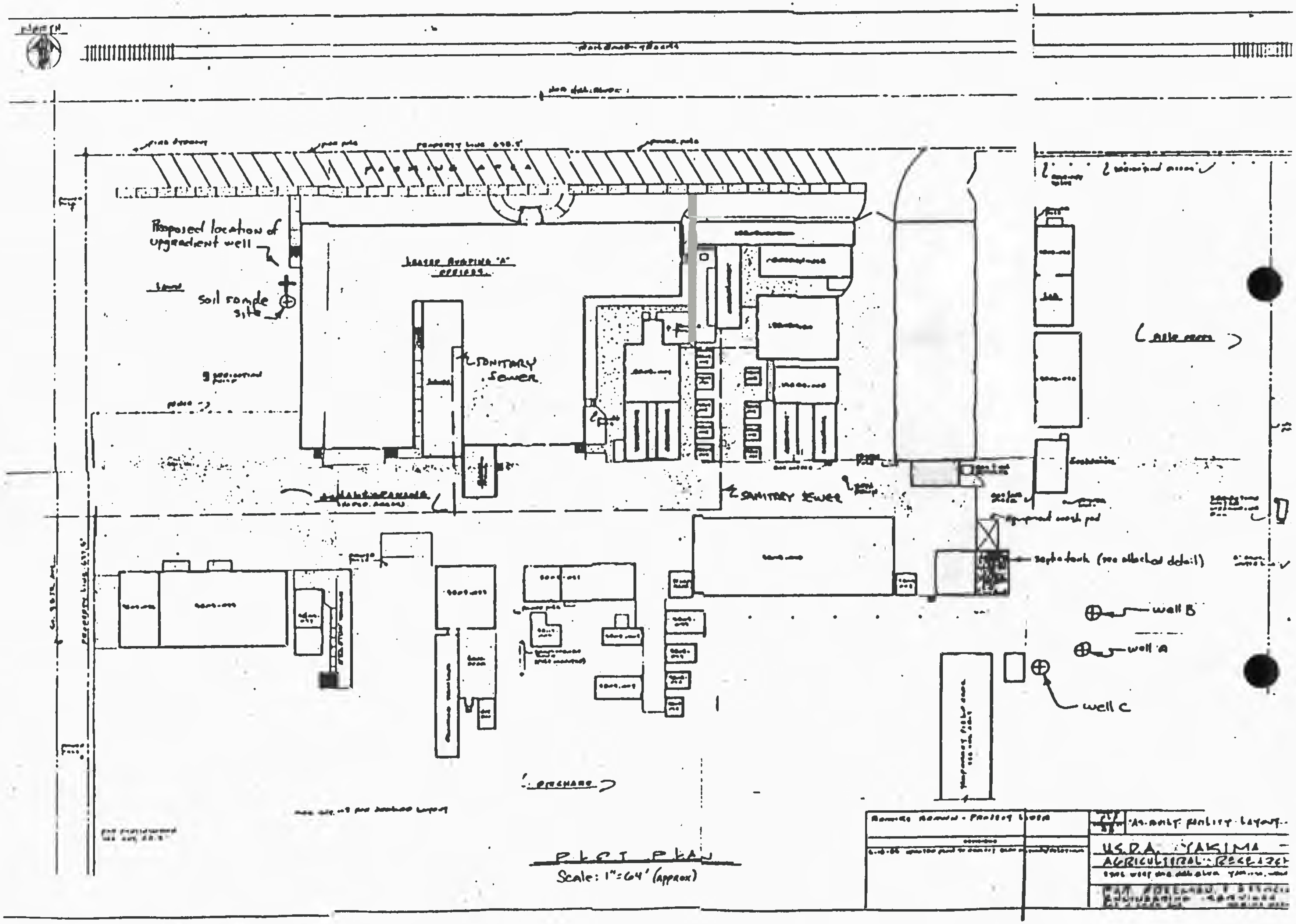
8. When closure is completed, ARS will submit to DOE certification both by the ARS and by an independent registered professional engineer that the facility has been closed in accordance with the specifications in the approved closure plan. Response to Comment e.

This certification of closure will be provided to DOE by ARS within 60 days of completion of closure.



Scale: 1 inch = 1/2 mile

Dom Reale Letter of May 24 1985



Proposed location of upgradient well
soil sample site
SANITARY Sewer
SANITARY SEWER
septic tank (see attached detail)
well B
well A
well C
PLOT PLAN
Scale: 1"=64' (approx)
U.S.D.A. YAKIMA
AGRICULTURAL RESEARCH

MONITORING WELL DESIGN

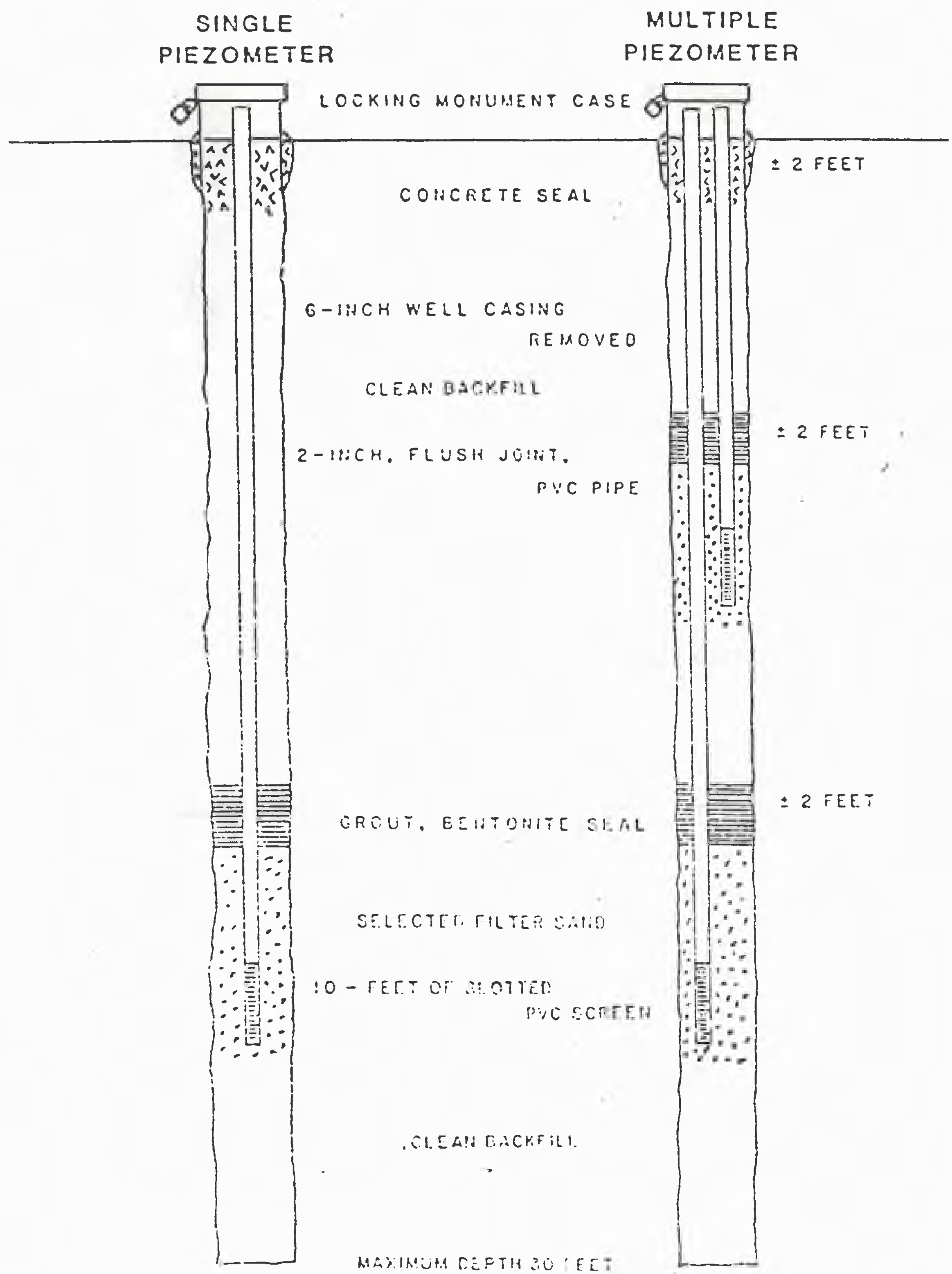
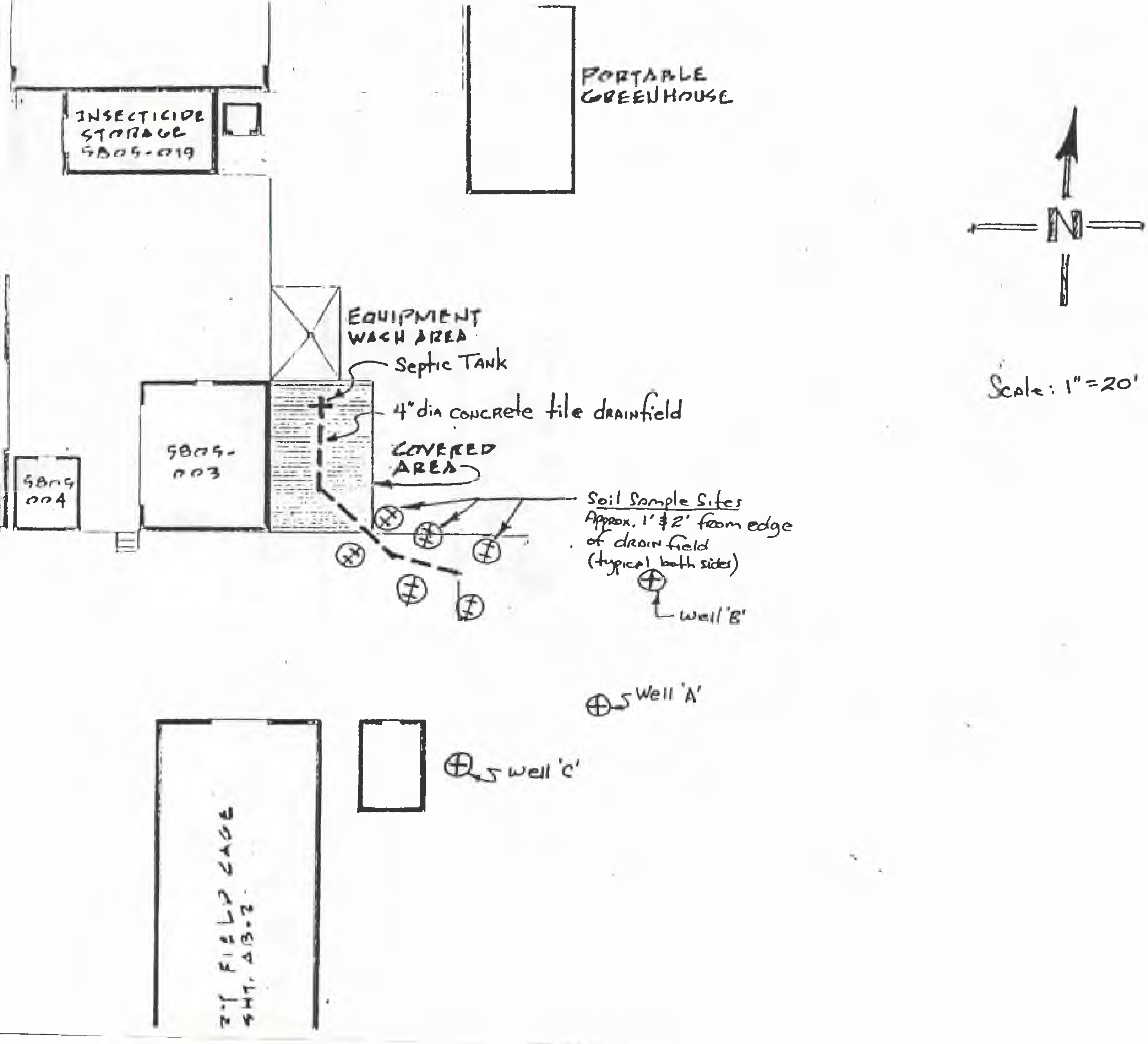
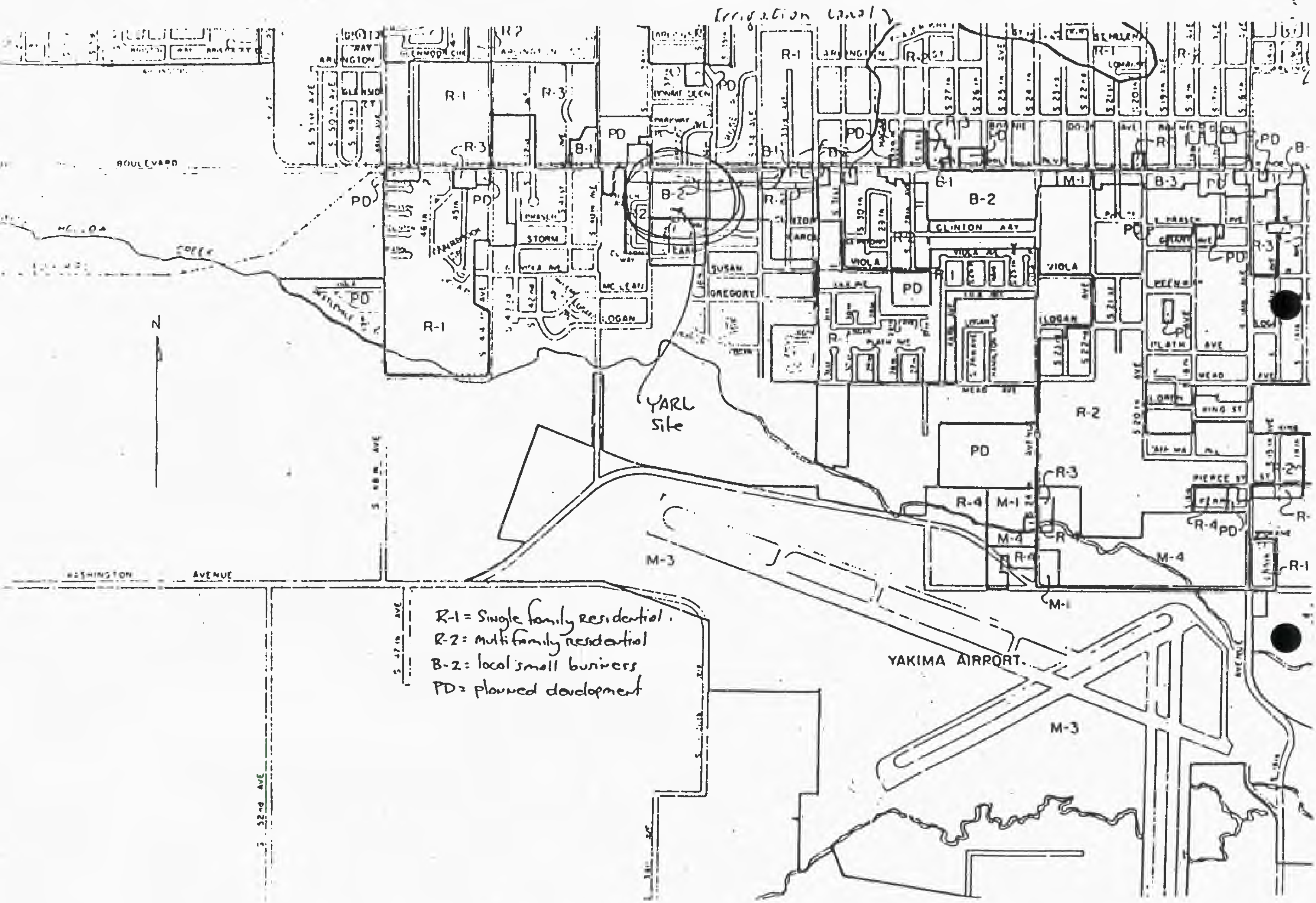


Figure 4



Scale: 1" = 20'



Scale : 3.5" = 1 mile

CHAIN OF CUSTODY RECORD

PROJ. NO. | PROJECT NAME

SAMPLERS: *(Signature)*

STA. NO.	DATE	TIME	COMP	GRAB	STATION LOCATION	NO. OF CON-TAINERS							REMARKS

Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*	Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*
Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*	Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*
Relinquished by: *(Signature)*	Date / Time	Received for Laboratory by: *(Signature)*	Date / Time	Remarks	